# Elimination

Elimination of contestants from a live IQ contest on a TV channel is decided in phases.

Initially at phase 0, *N* contestants, where  $N = 2^n$ , n < 10, are selected through a special online IQ contest in which a total of M(M > N) contestants participate. The contestants are identified by distinct registration numbers 1, 2,..., *M*. The selected contestants are ranked distinctly from 1 to *N* according to their performance in the online contest. They are qualified to participate in the live contest.

In the  $p^{\text{th}}$  phase, p = 1, 2, ..., n,  $K_p$  contestants participate in the live contest, where  $K_p = 2^{n-p+1}$ . On the basis of response to questions presented during the show,  $K_p/2$  of  $K_p$  contestants are ranked distinctly from 1 to  $K_p/2$ . These  $K_p/2$  contestants qualify to participate in the next phase. At the  $n^{\text{th}}$  phase there are only two contestants and the one selected at this phase is the winner of the contest.

You are required to write a program that identifies the winner of the contest, given the following information:

- INFO\_1: Registration numbers of *N* contestants who are selected through the online IQ contest, in order of the rank in the online IQ contest, and
- INFO\_2: A total of *N* 1 qualified contestants in different phases; *K*<sub>2</sub> in phase 1, *K*<sub>3</sub> in phase 2, ..., and *K*<sub>n+1</sub> in phase *n*. Qualified contestants of different phases appear in order of phases, i.e., phase 1, phase 2, ..., phase *n*. Further, qualified contestants in a phase, say phase *p*, appear in the order of the rank in the phase, i.e., the rank in phase *p*. A qualified contestant of a phase, say phase *p*, is identified by his/her rank in the previous phase, i.e., in phase *p* 1.

#### Input

Input may contain multiple test cases. For each case there are two input lines.

The first line gives N integers representing INFO\_1 while the second line gives N - 1 integers representing INFO\_2.

In each input line integers are separated by space. The input terminates with a line containing 0 as input.

### Output

For each test case there is only one output line. The line prints the registration number of the winner of the contest.

#### Sample Input

23 18 6 20 4 2 2 29 57 4 33 5 12 16 18 7 1 5 3 2 1 1 0

## Sample Output

18 29